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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/810,144

03/26/2004

Charles E. Baldwin

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01/19/2005

JAMES C. EAVES JR.
GREENEBAUM DOLL & MCDONALD PLLC
3500 NATIONAL CITY TOWER
101 SOUTH FIFTH STREET
LOUISVILLE, KY 40202

EXAMINER

LEE, SHUN K

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/810,144	Applicant(s) BALDWIN ET AL.	
	Examiner Shun Lee	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 and 11 August 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0804</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "50" has been used to designate both elastomer o-rings and inner end portion. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 34 and 180. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct

any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

- (a) "54" in line 8 of paragraph 37 should probably be --54'--; and
- (b) "64 prime" in line 4 of paragraph 43 should probably be --64'--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223).

In regard to claim 1, Murray *et al.* disclose (Fig.) a flexible scintillation-type radiation detector, comprising:

- (a) an elongated flexible tube (102) having first (106) and second (104) closed ends and defining therein a scintillation chamber;
- (b) liquid scintillation material (108) substantially filling the scintillation chamber;
- (c) said first closed end (106) including a substantially optically-transparent first end closure member (optical connection or window 106); and
- (d) photodetection circuitry (112) operably positioned relative to the first end closure member to quantitatively detect scintillating photons generated in the scintillation liquid (108) indicative of radiation passing into the scintillation chamber.

The detector of Murray *et al.* lacks an opaque, flexible protective sheath substantially surrounding the flexible tube. However, scintillating fiber optics are well known in the art. For example, Hurst *et al.* teach (Fig. 1; column 2, lines 6-12) to provide a protective sheath (7) for optical fibers (6) and scintillating fibers (5) for use in combination with a source of nuclear radiation as a level sensing gauge. By definition, a protective sheath is an enveloping structure that protects. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an opaque, flexible protective sheath substantially surrounding the flexible tube in the detector of Murray *et al.*, in order to protect the scintillating fiber optic detector when used in combination with a source of nuclear radiation as a level sensing gauge.

7. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) as applied to claim 1 above, and further in view of Wojcik *et al.* (US 5,859,946).

In regard to claims 2 and 7 which are dependent on claim 1, the modified detector of Murray *et al.* lacks an expansion chamber having a variable volume for accommodating volumetric expansion of the liquid scintillation material, the chamber being external of and in fluid communication with the flexible tube and including a movable wall therein. Wojcik *et al.* teach (Fig. 1) an expansion chamber (30) having a variable volume, the chamber (30) being external of and in fluid communication (26, 28) with the flexible tube (14) and including a movable wall (20) therein in order to accommodate volumetric expansion of the liquid scintillation material (16). Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an expansion chamber in the modified detector of Murray *et al.*, in order to accommodate volumetric expansion of the liquid scintillation material.

8. Claims 3-5, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) and Wojcik *et al.* (US 5,859,946) as applied to claims 2 and 7 above, and further in view of Ilzig *et al.* (US 4,286,839).

In regard to claims 3-5 (which are dependent on claim 2) and claim 8 (which is dependent on claim 7), the modified detector of Murray *et al.* lacks a spring means positioned to bias a movable wall (e.g., a slidable piston member) toward the scintillation liquid and a stiffener to prevent bending a portion of the scintillation chamber

in which the piston slidably moves with the slidable piston member defining a variable volume expansion chamber free of liquid scintillation material adjacent to the second end. Ilzig *et al.* teach (column 1, lines 10-30; column 4, lines 45-50) it is well known in the art that a cylinder and piston arrangement with spring pressure will respond to pressure changes of a liquid wave guide and that it is desirable to maintain a constant liquid wave guide pressure despite temperature variations. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a cylinder and piston arrangement with spring pressure in the modified detector of Murray *et al.*, in order to maintain a constant liquid wave guide pressure despite temperature variations.

In regard to claim 9 which is dependent on claim 7, the modified detector of Murray *et al.* lacks a member positioned to selectively immobilize the movable wall in a fixed position. Ilzig *et al.* teach (column 1, line 38 to column 2, line 2) that the piston can be used to position optical components. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a member positioned to selectively immobilize the movable wall in a fixed position in the modified detector of Murray *et al.*, in order to selectively immobilize an optical component mechanically coupled to the movable wall.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) and Wojcik *et al.* (US 5,859,946) as applied to claim 2 above, and further in view of Nath (US 3,995,934).

In regard to claim **6** which is dependent on claim 2, the modified detector of Murray *et al.* lacks that the expansion chamber has a fixed volume and is in fluid communication with the scintillation chamber. Nath teaches (column 4, lines 7-23) to provide a fixed volume expansion chamber in fluid communication with the liquid wave guide, in order to maintain a constant liquid wave guide pressure despite temperature variations. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a fixed volume expansion chamber in the modified detector of Murray *et al.*, in order to maintain a constant liquid wave guide pressure despite temperature variations.

10. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) as applied to claim 1 above, and further in view of Majewski *et al.* ("Economical detectors based on safe liquid scintillators", Nuclear Instruments and Methods in Physics Research A 414, pg. 289-298, 1998).

In regard to claims **10** and **11** which are dependent on claim 1, the modified detector of Murray *et al.* lacks a light reflector substantially surrounding the scintillation chamber and within the protective sheath and that the light reflector includes a flexible sheet substantially surrounding the sidewalls of the flexible tube. Majewski *et al.* teach (section 3 on pg. 291) to wrap TEFLON™ tape around the quartz cuvettes containing the scintillation liquid in order to optimize light collection. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to wrap a

flexible light reflective sheet substantially around the sidewalls of the flexible tube in the modified detector of Murray *et al.*, in order to optimize light collection.

11. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) as applied to claim 1 above, and further in view of Rozsa (US 6,407,390).

In regard to claim **12** which is dependent on claim 1, the modified detector of Murray *et al.* lacks that the photodetection circuitry includes temperature sensing circuitry that compensates for a shift in the detection of scintillating photons as a result of temperature variation in the detector. However, scintillator temperature compensation is well known in the art. For example, Rozsa teaches (column 1, line 10 to column 2, line 8) it is well known in the art to provide temperature sensing circuitry (e.g., comprising a thermistor) that compensates for a shift in the detection of scintillating photons as a result of temperature variation in the detector. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide temperature sensing circuitry in the modified detector of Murray *et al.*, in order to compensate for temperature variations.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murray *et al.* (US 2004/0051048) in view of Hurst *et al.* (US 4,471,223) as applied to claim 1 above, and further in view of McDermott (US 5,457,877).

In regard to claim **13** which is dependent on claim 1, the modified detector of Murray *et al.* lacks that the flexible protective sheath is armored to resist crushing forces. However, armored protective sheaths are well known in the art. For example,

McDermott teaches (column 1, lines 11-35) that armored protective sheaths comprising metal layers and/or wire mesh are used as protective sheathing for fiber optics.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an armored protective sheath in the modified detector of Murray *et al.*, in order to achieve maximum protection for the scintillating fiber optic detector when used in combination with a source of nuclear radiation as a level sensing gauge.

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Art Unit: 2878

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CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878